BOOK REVIEWS

INTRODUCTION TO THE THEORY OF IONIZED GASES—by J. L. Delcroix. Translated by M. Clark, Jr., D. J. BenDaniel and J. M. BenDaniel. Interscience Publishers, Inc. pp. xi+149.

Quite a few books have recently been written on plasma physics, i.e., physics of ionized gases, reflecting the current interest in the subject. Of these, the above book by Prof. Delcroix is an illuminating introduction to the theoretical aspect. Based on an analysis of the interaction of the constituent particles in an ionized gas, viz., electrons, ions and neutral molecules, the book interprets the macroscopic properties of the gas in terms of the microscopic description.

The following topics are discussed : elastic collisions, kinetic theory of gases, free electron gas, collective phenomena in plasma, and weakly as well as strongly ionized gases. The brief but lucid exposition of the basic phenomena is a characteristic feature of the book. The physical interpretation of some important equations is, in particular, worth mentioning. However, the simple scheme presented for calculating the frequency of plasma oscillations (pp. 100-101) may give rise to a wrong conception, as it leads, in fact, to the phenomenon of plasma resonance (Tonks, L., 1931, Phys. Rev., **36**, 1458 ; Herlofson, N., 1951, Arkiv for Fysik, **2**, 247) rather than that of plasma oscillation (Tonks, L. and Langmuir, I., 1929, Phys. Rev., **33**, 195).

Since detailed description has all along been avoided for the sake of conciseness, it would have been more helpful to research workers if references were cited in the text for all the major items and if the list of references were made a bit more comprehensive.

The book under review is a happy translation of the original French volume, and those who intend to be familiar with ionized gases but are not familiar with French would be thankful to the translators for their valuable service.

J. B.

PROCEEDINGS OF THE 1967 INTERNATIONAL CONFERENCE ON PARTICLES AND FIELDS : Edited by C. R. Hagen, G. Guralnik, and V. S. Mathur, Interscience Publishers, New York.

The book under review is the proceedings of a conference held in the University of Rochester, U.S.A. from August 28 to September 1, 1967. It is worth mentioning that a time lag of only about six months between the conference and the date on which the Proceedings appeared in print should be all existing standards be regarded as a great achievement by the editors of the present Proceedings.

The conference had seven different sessions all of which, except for the first one, were devoted to reviewing and reporting of recent developments in field theory and in the theoretical aspects of the physics of elementary particles and strong interaction. The first session provides an excellent survey of the latest experimental situation in the fields of weak electromagnetic, and strong interaction physics. For theorists who would like to be confronted directly with relevant experimental results rather than be submerged under the details of experimental techniques and apparatus the usefulness of the first session can hardly be overemphasised. Most of the remaining sessions start with review talks which are followed by individual contributions. The only exception to this rule is the second session which deals with new approaches

to field theory. Here the order has been reversed and the nature of the review talk is significantly different from its counterparts in other sessions in the sense that the reviewer makes a critical assessment of the contributions of the preceding speakers and attempts to put these contributions in a proper perspective. In the opinion of the present reviewer the individual contributions in a particular session are not always in keeping with the spirit of the title of that session. Thus the contribution by Logunov on 'High energy behaviour of inelastic cross sections' seems to be out of place in the third session which deals with 'Axiomatic field theory and applications'. A more appropriate place for this contribution according to the present reviewer, is in the last session on 'Strong interaction dymamics'. Similarly the contribution by Kastler on 'The Goldstone theorem in axiomatic field theory' in the fourth session seems to fit better in the third. Indeed, the present reviewer feels that the fourth session which is so limited both in size and by the scope of its title (Broken symmetries and Goldstone theorem) might as well have been merged with the third session. The fifth and the sixth sessions provide an excellent of recent developments and achievements in the fields of representation of elementary particles by infinite component wave functions and applications of current algebra techniques respectively. It seems that in the session on current algebra techniques considerable interest was focussed by almost all the speakers on a recent derivation of the mass difference between the charged and the neutral pions. The last session on 'Strong interaction dynamics' deals mainly with the Regge polology of high energy phenomena with some reference to the questions 'Bootstraps' and dispersion theoretic (non current-algebraic) sum rules. The discussions following the contributions are quite interesting and lively. One is, however, amused to note that during these discussions there are occasional intrusions of long and detailed reports which for all practical purposes may be considered as individual contributions.

The proceedings provide a quick and fairly complete survey (including references to published papers) of the developments till September 1967 in the topics to which the different sessions of the conference were devoted. It would, therefore, be very useful to workers who are interested in quantum field theory and the theoretical aspects of the physics of elementary particles and high energy phenomena.

H. B.

PROGRESS IN NUCLEAR PHYSICS, Vol. 9 Edited by O. R. Frisch. Pergamon Press—England, Price-90 sh net.

This book contains review articles on a wide variety of topics mainly on high energy nuclear physics by active workers in the respective fields. The first article 'Spark Chambers' by J. G. Rutherglen not only provides a basic framework towards under-standing the principle of its operation but also discusses the technical aspects pertaining to its construction. This article is mainly aimed at demonstrating the usefulness of spark chambers as an effective visual technique for experiments in high energy physics and therefore their recent applications to certain low energy experiments are not covered. The article on semiconductor counters by G. Dearnaley presents a good introduction to the function, operation and preparation of different types of these counters outlining their various applications to nuclear physics. Since the time this article was written, there have been rapid advances is this field especially in the development of Lithium-drifted Silicon and Germanium detectors for high resolution photon spectroscopy. Consequently this article is not expected to provide an upto date information required by research workers in experimental nuclear physics. The next article 'Theoretical Techniques of High-Energy Beam Design' by N. M. King gives a good theoretical analysis of the subject. It starts with a brief summary of beam concepts and an outline of the basic

principles of major beam elements followed by a discussion of the application of the quadrupole matching techniques and the problems of separated beam design. This article should provide to be of great use for those actively engaged with the beam design work. The fourth article by R. J. Eden reviews the scope and the methods of structural analysis of collision amplitudes which link theory and experiment in the physics of elementary particles and therefore should be of interest to both the experimental and theoretical workers in the field. The next article by E. H. S. Burhop, D. H. Davis and J.Zakrzewski is an exhaustive and comprehensive review of the interaction of strange particles with nuclei. In particular, the authors have discussed the basic interactions of strange particles with nucleons, capture of negatively charged particles by atomic nuclei, the interaction of K-Mesons, Λ°-Hyperons and other strange particles with nuclei. Finally it is stressed that the strange particles can serve as an effective probe for the study of nuclear structure. The last article by F. J. M. Farley is mainly confined to a discussion of the electromagnetic properties of the Muon which can serve as an important tool for testing quantum electrodynamics.

This series "Progress in Nuclear Physics" edited by O. R. Frisch is know for its tradition of collecting excellent review articles on subjects of current interest by eminent authors and this particular volume 9 is no exception to it. This volume 9 should find a prominent place in the library of any research institution.

S. S. K.

MECHANICS OF METERIALS—by Prof. Seibert Fairman and Prof. Chester S. Cutshell, John Willey & Sons, Inc. New York. Price $ 14.95.

The book was first published in the year 1963 and the fourth reprint, which was given for review, came out in the year 1963.

The basic elements of the subject have been carefully selected and incorporated in the book giving complete first course in 'Strength of Materials'.

The book will be very helpful to the students. Many worked out typical problems, to explain the theory, have been included to make it more interesting to the students.

The book deals very lucidly the chapter on deflection of beams, specially the area moment method, and the statically indeterminate beams. The chapter of combined stresses given at the end gives a better understanding of the subject matter to the students.

It is a well planed and well written text book. The unit used in the book is F.P.S. system."

G. C. S.